audits of more advanced radiotherapy technologies such as IMRT is timely since they are becoming increasingly used for cancer treatment across the world.

Materials and Methods: The CRP has developed new methodologies for four audit steps: (i) remote verification of TPS calculation of small beam output factors (ii) dosimetry audit of MLC positional performance for IMRT using radiochromic film, (iii) film audit of single clinical IMRT field dose delivery and (iv) 'end-to-end' dosimetry audit (imaging, planning, dose delivery) for multiple field IMRT techniques using TLDs and radiochromic films. New procedures and phantoms as well as instructions and data sheets for audited centres have been developed and are being tested through multinational pilot studies. The CRP has brought together research groups from 14 countries across the world.

Results: The first CRP study developed and tested procedures for the audit of small beam output of high energy photon beams relevant for IMRT treatment planning. TPS calculated beam outputs were compared to the published reference data sets. The results show good agreement (within 1%) between the TPS output and the reference data for field sizes ≥ 4 × 4 cm^2 but dose overestimation by TPSs by 2%-3% for field sizes ≤ 3 × 3 cm^2. The second step evaluated MLC performance using picket fence tests and revealed that most audited MLCs perform as expected. The third step involved a comparison of gamma analysis techniques. This included a multicentre analysis of a single film irradiated with a complex field arrangement, which highlighted differences in gamma agreement attributable to the differences in film scanners and calculation algorithms employed in gamma analysis software. This test also included irradiation and analysis of a complex clinical field by each institution. Most results available to-date show good agreement between the TPS plans prepared by the participants and the dose distributions delivered to the films. The fourth step 'end-to-end' IMRT audit is on-going.

Conclusions: A four step methodology for remote dose audits for advanced radiotherapy dose delivery relevant to IMRT has been developed, and following the successful testing, is being made available. The CRP results thus far indicate challenges in TPS commissioning for small field sizes, and challenges for multicentre comparison of gamma analysis for complex dose distributions.

PO-0846

A retrospective analysis of 384 Tomotherapy per-patient verifications

M. Stasi[1], S. Bresciani[1], A. Miranti[1], A. Di Dia[1], A. Maggio[1], D. Dispirito[1]
[1]*IRCCS-FPO Candiolo, Medical Physics, Candiolo, Italy*

Purpose/Objective: The purpose of the present study is to do a retrospective analysis of the percentage-gamma-pass (%GP) values obtained from a large dataset of Tomotherapy pre-treatment Quality Assurance (QA) to determine which are the pathologies and planning parameters more susceptible of producing poorer QA results.

Materials and Methods: 384 Helical Tomotherapy (HT) pre-patient QA were considered. For each plan, treated pathology and planning parameters (field width (FW), pitch, modulation factor (MF), number of sinogram segments, calculation grid, gantry period, total treatment time, couch travel distance, fraction dose, simultaneous boost technique) have been reported. The 3D diode array ArcCHECK™ and 3%/3mm , both with local and global normalization, gamma index metric has been used to perform comparison between measured and planned dose distributions.

Results: We obtained an average %GP equal to (96.1±4.4), (92.5±7.5) and (96.9±4.7) for the %GP evaluated by using global and local with two dose difference threshold (DDT) equal to 3 and 5 cGy, respectively. The results of our analysis showed that %GP results depend, on one hand, on the GI calculation method, and, on the other hand, on the treated pathologies, which have different treatment planning parameters, dose prescriptions and extensions of irradiated volumes. In particular, a statistical dependence with irradiated length, maximum dose to diodes, dose per fraction and pitch was observed. Correlation Coefficient (CC) and p-value (P) for the significance of the correlation between global and local %GP with DDT equal to 3 and 5 cGy and planning parameters are shown in the following table.

		%GP global	%GP local 3cGy	%GP local 5cGy
Couch travel	CC	0.004	-0.420	-0.449
	P	0.9365	<0.0001	<0.0001
D_{max} on diodes	CC	0.164	-0.453	-0.550
	P	0.0016	<0.0001	<0.0001
D/Fr	CC	-0.035	-0.247	-0.226
	P	0.4881	<0.0001	<0.0001
Calculation grid	CC	0.039	0.024	0.011
	P	0.4506	0.6324	0.8264
MF	CC	-0.081	0.016	0.034
	P	0.1139	0.7476	0.5079
Pitch	CC	0.036	-0.207	-0.186
	P	0.4810	<0.0001	0.0002
Gantry period	CC	-0.005	0.019	0.019
	P	0.915	0.7046	0.7050

Conclusions: Tomotherapy QA can generally achieve %GP higher than 90%. Attention should be paid when performing pre-treatment QA of plans with large pitch value, long irradiated volumes, high dose regions that falls on the ArcCheck's diodes and high doses per fraction, because they are more susceptible of having a lower %GP. Nevertheless, %GP is independent on modulation factor.

PO-0847

Exploiting the asymmetric layer geometry of EBT2 radiochromic film for assessment of skin dose and steep gradients

C. De Wagter[1], N. De Maeseneire[1], N. Goethals[2], A. De Puysseleyr[2], W. De Neve[1], Y. Lievens[1]
[1]*Gent University Hospital, Radiotherapy, Gent, Belgium*
[2]*Gent University, Radiation Oncology and Exp Cancer Research, Gent, Belgium*

Purpose/Objective: The 30-µm thick sensitive layer of EBT2 film is coated onto a 175-µm thick polyester substrate while the overlaminate features a thickness of a mere 75 µm, consisting of 25-µm adhesive and 50-µm polyester. In literature, this asymmetric construction has been criticized as it introduces an extra dependence of the upside-down